

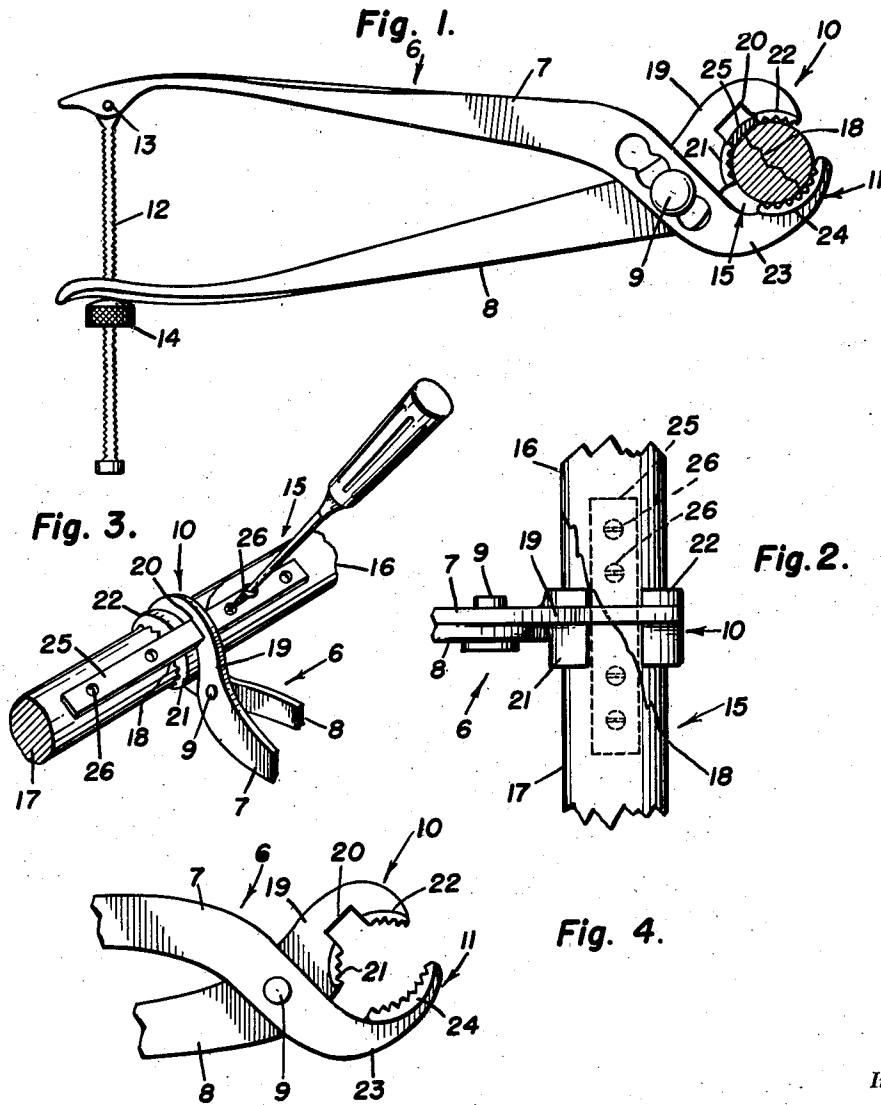
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HOLDING TOOL

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HOLDING TOOL

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2 Claims. (Cl. 128—346)

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The present invention relates to structural and functional improvements and refinements in hand tools such as pliers, wrenches, vises and the like and has reference, more particularly, to a tool or the like having opposed work clamping and holding jaws in which at least one of the jaws has special facilities enabling the instrument to perform in a unique and heretofore unknown manner.

Briefly, and somewhat broadly asserted, the cardinal purpose of the invention is the provision of a hand tool equipped with complementary jaws to securely embrace, and clamp, axially aligned work-pieces or the like in end-to-end abutting relationship, said jaws wholly or partially bridging said abutting ends of said work-pieces and simultaneously exposing and rendering accessible a predetermined area of the site acted on, this in a practical and efficient manner to allow a separate work-piece joining plate (or an equivalent mechanical connecting element) to be brought into play and fastened in place while said tool is still clamped around the work, whereby the necessity of removal of said tool at this stage of operation is obviated.

Ordinarily, when two work-pieces are thus held between opposed clamping jaws, the major areas of the jaw-faces are in complete gripping contact with opposite sides of said work-pieces and hence there exists no means allowing a tie-plate or equivalent means to be introduced between a then clamped jaw and the work. It is, therefore, a primary object of the instant invention to construct one or both jaws with a clearance space in which a tie plate may be inserted.

A specific and preferred application of the invention is to bone-holding forceps, used in the open reduction of fractures of tubular bones. Customary surgical procedure includes the use of forceps, generally in pairs, to grasp the fractured ends of the bone and to manipulate them into reposition, after which one forceps is usually sufficient to maintain the reduction. Without the present improvement in one of the jaws it has been standard practice to release the instrument or forceps in order to make way for the application of a metal plate along the longitudinal surface of the bone, and which is fixed to the bone at each side of the fracture by the use of screws. With the plate adapter and clearance in the upper jaw of the forceps, the conventional plate can be easily and effectively slipped into place and secured to both fragments of the bone without endangering loss of the reduction, fol-

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lowing the initial setting of the bone and while these parts are firmly held.

More particularly, and keeping in mind the fundamental inventive idea and its applicability to tools in general having jaw means as well as bone forceps and clamps, the preferred embodiment of the inventive concept is carried out in the form of a simple clearance space, which is provided by notching a jaw to provide gripping faces on both sides of the notch in order that while the clamp is closed a splicing plate may be readily inserted in the most effective position and there secured.

Other objects, features and advantages will become more readily apparent from the following description and the accompanying illustrative drawings.

In the drawings, wherein like numerals are employed to designate like parts throughout the same:

Figure 1 is a side elevational view showing the invention incorporated in pliers-like forceps and also showing the forceps clamped around a bone part, the bone plate, a conventional part, being shown in place in cross section.

Figure 2 is a fragmentary top plan view of the right hand end portion of the structure depicted in Figure 1;

Figure 3 is a fragmentary perspective view showing the manner in which the tool is used, and

Figure 4 is a fragmentary view similar to Fig. 1, the work piece in the tool or forceps being omitted.

Referring now to the drawings the holding tool or implement is designated, in a unitary sense, by the numeral 6. Since I consider the invention applicable to all suitable forms of clamping jaws on divers types of tools and implements, the expression "tool" is used advisedly and is intended to convey a meaning of the word in its broadest sense. For purposes of reducing the invention to actual practice and properly illustrating the same for adequate disclosure herein, the tool shown is a pair of pliers or "pliers-type" surgical forceps, comprising crossed handles 7 and 8 pivotally connected together as at 9 and terminating in upper and lower opposed clamping jaws 10 and 11. A retaining screw 12 is pivotally connected as at 13 to one of the levers and operates through a slot in the other lever and is provided with an adjusting and retaining nut 14. The "work" herein under consideration may be any suitable axially aligned parts or elements. Inasmuch as the invention, however, is shown as applied to surgical

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forceps it is to be understood that the clamping jaws are therefore shown embracing a leg, arm or equivalent bone structure 15, the bone parts or "elements" being denoted at 16 and 17 and abutting in end-to-end relation at opposite sides of a line of fracture 18.

The gripping portion of the upper jaw 10 is denoted by the numeral 19 which is arcuately curved to conform to the bone structure. Extending transversely of this jaw is a clearance notch, or slot 20 which divides said work contacting surface into spaced gripping portions 21 and 22. The other jaw 11 is shown as conventional having an arcuate tooth or gripping surface 24. I might mention in this connection that the inventive thought comprehends the use of the clearance passage 20 in either one or both jaws. However, for surgical use this passage is placed in the jaw which in operation is uppermost and thus faces the surgeon.

It will be evident from the disclosure and particularly Figure 3 that an instrument having jaws as shown and described will facilitate handling of said instrument so as not to interfere with drilling or other work at the site of the fracture. The means also provides a requisite "sight opening" for exposure of a fracture and the surrounding area for inspection and operating purposes. Primarily, the improvements are destined to facilitate insertion of a regulation or standard type bone plate 25, to permit it to be fastened in place by screws 26.

These plates currently used for repairing bone fractures are of different sizes and shapes and are made of various materials.

Minor changes in shape, size, materials and re-arrangement of parts may be resorted to in actual

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practice so long as no departure is made from the invention as claimed.

What is claimed is:

1. A bone clamping instrument comprising pivoted handles having at their forward extremities opposed clamping jaws for engaging the opposite surfaces of a bone to hold fractured parts thereof together, one of said jaws being provided with a through way slot extending outwardly from its clamping face for the reception of a fracture splicing plate.

2. An instrument for clamping fractured bones comprising a pair of pivoted handles one having a clamping jaw for engagement beneath the inner side of a bone, the other having a clamping jaw for engagement with the outer side of said bone and cooperating with the first mentioned jaw to reduce and hold a bone fracture, the last mentioned jaw having its clamping face provided with a transverse aperture for the reception of a splicing plate in contact with the clamped bone and spanning a fracture line thereof.

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